



## FOOD & OTHER GUM INFORMATION

### Guar gum

Guar gum is more soluble than locust bean gum and is a better emulsifier as it has more galactose branch points. Unlike locust bean gum, it is not self-gelling. However, either borax or calcium can cross-link guar gum, causing it to gel. In water it is nonionic and hydrocolloidal. It is not affected by ionic strength or pH, but will degrade at pH extremes at temperature (e.g. pH 3 at 50°C). It remains stable in solution over pH range 5-7. Strong acids cause hydrolysis and loss of viscosity, and alkalis in strong concentration also tend to reduce viscosity. It is insoluble in most hydrocarbon solvents.

Guar gum shows high low-shear viscosity but is strongly shear-thinning. It is very thixotropic above concentration 1%, but below 0.3% the thixotropy is slight. It has much greater low-shear viscosity than that of locust bean gum, and also generally greater than that of other hydrocolloids. Guar Gum shows viscosity synergy with xanthan gum. Guar gum and micellar casein mixtures can be slightly thixotropic if a biphasic system forms.

#### Thickening

Guar gum is economical because it has almost 8 times the water-thickening potency of cornstarch - only a very small quantity is needed for producing sufficient viscosity. Thus it can be used in various multi-phase formulations; as an emulsifier because it helps to prevent oil droplets from coalescing, and/or as a stabilizer because it helps to prevent solid particles from settling.

### Xanthan gum

One of the most remarkable properties of xanthan gum is its capability of producing a large increase in the viscosity of a liquid by adding a very small quantity of gum, on the order of one percent. In most foods, it is used at 0.5%, or even as low as 0.05%. The viscosity of xanthan gum solutions decreases with higher shear rates; this is called pseudoplasticity. This means that a product subjected to shear, whether from mixing, shaking or even chewing, will thin out, but once the shear forces are removed, the food will thicken back up. A practical use would be in salad dressing: The xanthan gum makes it thick enough at rest in the bottle to keep the mixture fairly homogeneous, but the shear forces generated by shaking and pouring thins it so it can be easily poured. When it exits the bottle, the shear forces are removed and it thickens back up so it clings to the salad. Unlike other gums, it is very stable under a wide range of temperatures and pH.

In foods, xanthan gum is most often found in salad dressings and sauces. It helps to stabilize the colloidal oil and solid components against creaming. Also used in frozen foods and beverages, xanthan gum creates the pleasant texture in many ice creams. Toothpaste often contains xanthan gum, where it serves as a binder to keep the product uniform. Xanthan gum is also used in gluten-free baking. Since the gluten (found in wheat) must be omitted, xanthan gum is used to give the dough or batter a "stickiness" that would otherwise be achieved with the gluten. It is also a preferred method of thickening liquids for those with swallowing disorders, since it does not change the color or flavor of foods or beverages.

In the oil industry, xanthan gum is used in large quantities, usually to thicken drilling fluids. These fluids serve to carry the solids cut by the drilling bit back to the surface. The widespread use of horizontal drilling and the demand for good control of drilled solids has led to the expanded use of xanthan gum. Xanthan gum has also been added to concrete poured underwater, in order to increase its viscosity and prevent washout.

In cosmetics xanthan gum is used to prepare water gels usually in conjunction with bentonite clays. Is also used in oil in water emulsions to help stabilise the oil droplets against coalescence. It has some skin hydrating properties.

Allergy - Some people are allergic to xanthan gum, with symptoms of intestinal gripes and diarrhea. Workers exposed to xanthan gum dust exhibit nose and throat irritation as well as work-related illness, with symptoms becoming more prevalent with increasing exposure. Also, since xanthan gum is produced by a bacteria that is fed corn to grow, some people allergic to corn will also react to it

### Locust bean gum

Locust bean gum is a galactomannan vegetable gum extracted from the seeds of the Carob tree. It is used as a thickener and gelling agent in food technology. It is also called Carob Gum.



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### Pectin

The main use for pectin is as a gelling agent, thickening agent and stabilizer in food. The classical application is giving the jelly-like consistency to jams or marmalades, which would otherwise be sweet juices. For household use, pectin is an ingredient in jelling sugar (sometimes sold as “sugar with pectin”) where it is diluted to the right concentration with sugar and some citric acid to adjust pH. In some countries, pectin is also available as a solution or an extract, or as a blended powder, for home jam making. For conventional jams and marmalades that contain above 60% sugar and soluble fruit solids, high-ester pectins are used. With low-ester pectins and amidated pectins less sugar is needed, so that diet products can be made. Pectin can also be used to stabilize acidic protein drinks, such as drinking yogurt, and as a fat replacer. Typical levels of pectin used as a food additive are between 0.5 – 1.0% - this is about the same amount of pectin as in fresh fruit.

In medicine, pectin increases viscosity and volume of stool so that it is used against constipation and diarrhea. Until 2002, it was one of the main ingredients used in Kaopectate, along with kaolinite. Pectin is also used in throat lozenges as a demulcent. In cosmetic products, pectin acts as stabilizer. Pectin is also used in wound healing preparations and specialty medical adhesives, such as colostomy devices.

In ruminant nutrition, depending on the extent of signification of the cell wall, pectin is up to 90% digestible by bacterial enzymes. Ruminant nutritionists recommend that the digestibility and energy concentration in forages can be improved by increasing pectin concentration in the forage.